

OUR BOOK SHELF.

An Elementary Course of Physics. Edited by Rev. J. C. P. Aldous, M.A. Pp. 862 + vi. (London: Macmillan and Co., Ltd., 1898.)

IN this book an attempt is made to give a modern and practical course of natural philosophy in a compendious form, and it may be stated at once that the effort is a most successful one. It is the joint work of the editor, who is chief instructor on H.M.S. *Britannia*, Mr. W. D. Eggar, and Prof. F. R. Barrell. The editor is himself responsible for the sections dealing with mechanics, properties of matter, hydrostatics, and heat, in which the readers are provided with "a groundwork of theoretical knowledge which may enable them to understand and use the simple processes of the kinetic method, to express themselves with accuracy when necessary, and to deal with simple mechanical problems." Wave-motion, sound, and light are admirably treated by Mr. Eggar, while Prof. Barrell's contribution deals with the subjects of magnetism and electricity.

The treatment of the various subjects is most lucid and thorough, and is evidently based on an intimate acquaintance with the requirements of students. Great pains have been taken to avoid looseness of statement; and the fact that some of the sections have had the advantage of the criticisms and suggestions of Lord Kelvin, Lord Rayleigh, and others, makes it a trustworthy book of reference. Where everything is so well done it is difficult to select points for special mention, but it may be remarked that examples drawn from naval sources form a notable and valuable feature, and graphical methods of representing experimental results are largely utilised and encouraged. The generous supply of illustrations, which number nearly six hundred, and not one that fails to serve a useful purpose, enhances the value of the book, and will make it acceptable to a wider circle of readers than that comprised by students following a specified curriculum. The book is of convenient size, and is printed in very clear type; we believe it is destined to take a high place in our schools and colleges.

L'Algérie. Le Sol et les Habitants, &c. Par J. A. Battandier et L. Trabut. Pp. viii + 360. (Paris: Baillière et fils, 1898.)

THIS little volume is one of a class of books which is much better represented abroad than in this country—one, that is, in which a complete picture is given of a limited part of the earth's surface, under the varied aspects which make up its geography in the widest sense of the term. It is written on a scientific plan, the broad physical features of the country being taken as the basis of the whole description. In Algeria the authors distinguish three main zones, the Tell (or cultivable region), the Steppe, and the Sahara, holding that the plateaux, which some writers have made into a separate division, do not form a natural region, but fall within the Tell or the Steppe according to the amount of rain which falls. The determining factor, indeed, in the geography of the whole region, is the preponderance of the moist rain-bearing winds from the north-west, or of the parching desert winds from the south and south-east. Each of the zones is in turn described, special attention being given to their natural resources; and the fact that for over twenty years the authors have traversed the country in the prosecution of their botanical researches, enables them to speak with the accurate knowledge which can only be acquired at first hand. The inhabitants, the fauna and the geology of Algeria are also sketched in outline, so that we have in small compass a useful summary of all that is known of the country. The general conclusion arrived at is that Algeria is capable of supporting a large population, and that, in spite of the slow modification the climate has undergone since the dawn of history, cultivation will still be possible for many centuries to come.

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LETTERS TO THE EDITOR

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Electric Light Wires as Telephonic Circuits.

I WISH to put on record the following method of using electric lighting wires as telephonic circuits. I was requested some time ago to try to localise a fault in an electric light main, by means of a certain form of inductor used in conjunction with a telephone but not connected to the main. While using it, it occurred to me that probably the main might be used instead of a telephone wire. My first experiments were not productive of good results, as a small fraction of the Company's current passed continuously through the telephone. In October 1897, I placed $\frac{1}{2}$ microfarad condensers in my telephone circuit at each end; these stopped the current, but in no way reduced the telephonic effects. If the note given out by virtue of the rotation of the armature of the dynamo is great, it can be very greatly reduced by placing an inductively wound resistance in the circuit.

The resistance does not appear to modify the telephonic effects in any marked degree. This probably arises from the fact that the E.M.F. due to the secondary coil of the telephone transmitter is high. The experiment was successfully made over two miles of a main which was carrying the full load used in lighting the town.

F. J. JERVIS-SMITH.
Oxford, May 16.

Sub-Oceanic Terraces and River Channels off the Coast of Spain and Portugal.

WILL you allow me once more to briefly describe in advance the physical features under the Atlantic off the coast of Spain and Portugal, continuous with those opposite the coasts of the British Isles and the Bay of Biscay, already reported in your columns (NATURE, March 24 and April 21)?

The great escarpment already described as descending into deep waters from the margin of the British-Continental platform is still traceable southwards along the coast of Portugal from Cape Finisterre as far at least as the mouth of the Tagus estuary, where it appears to begin to broaden out and merge into a generally rapid slope—or probably a succession of terraces. The breadth of the platform along this coast averages only 30 to 40 miles from the shore, and its margin very nearly follows the 200-fathom contour; but here the descent to the 1000-fathom contour is steep, though seldom precipitous, and is varied by numerous bays and headlands. Owing to the insufficiency of the soundings, especially off Vigo Bay, the definition of the cañons, or old river channels, is scarcely as clear as in the region further north. Still, I have been able to determine several with a great degree of certainty, such as those formerly continuous with the rivers Padron, Lima, Douro, and Tagus. There are also a few which cannot apparently be followed to their sources in the present land, such as one of special depth and precipitancy in lat. $40^{\circ} 31' N.$, distant about 40 miles off the coast of Portugal at Barra Nova. The continuation of these features to the Straits of Gibraltar and into the Mediterranean remains for future investigation.

20 Arundel Gardens, W., May 16. EDWARD HULL.

Bacteria on an Ancient Bronze Implement.

MR. NICHOLSON probably refers to what is known to archaeologists as "bronze cancrioid."

In the last number of the *Journal* of the Royal Society of Antiquaries of Ireland, March 31, this subject is referred to under the name of "Ulcerative Disease of Bronze or 'Bronze Cancrioid,'" by Dr. William Frazer.

As many readers of NATURE interested in bacteria may not be able to conveniently refer to this journal, the following points brought forward by the author will be read with interest. He says, "all objects of antiquity fabricated from metallic copper, and its important alloy made by adding tin in certain proportions, are liable to be attacked by this destructive

corroding affection." The "bronze disease," says Dr. Frazer, "produces a remarkable disintegrating effect on the object it attacks, and there are good reasons for considering that it possesses infective powers, spreading like a leprosy through the substance of the metal, and slowly reducing it to amorphous powder; further, there are substantial grounds for believing it capable of being conveyed from surfaces already suffering with it to those yet uninfected. So that dishonest counterfeiters of antiques now propagate it on their modern forgeries to deceive intended purchasers. This infamous act is as yet understood to be confined to Italy, where the greater part of these forgeries are made." "In genuine antiques, it unfortunately happens occasionally that the patinated surface of bronze, soon after its discovery from recent excavations, becomes affected with this distinctive bronze disease, which makes its appearance in a number of small spots of clear pale blue colour, that swell and form farinaceous elevations; in the course of time, especially when kept in a moist atmosphere, these spots enlarge, run together and multiply, gradually invading the greater part of the surface, and reducing the object to a powdery condition."

Dr. Frazer says a remedy is found in ink made from sulphate of iron and oak galls, and that scraping "risks a fresh outbreak of this infectious malady." Further on he says the chief operator in Rome is well known, and "It would appear that those skilful artists of false antiques having succeeded in counterfeiting genuine patinations, so as to deceive the most learned collectors, have subsequently gone to the length of infecting their reproductions with spots of the bronze disease. This is no mere superficial imitation which they cause, but absolute inoculation of the destructive canker itself."

In conclusion, Dr. Frazer refers to an article in the *Revue Archéologique* on the same subject by the late Count Michel Kyskiewicz, under the title, "Notes and Souvenirs of an Old Collector." W. G. S.

Dunstable.

I AM not aware of any book on the subject, but Mr. Nicholson will find scattered notices in the *Zeitschrift für Hygiene* and *Arch. für Hygiene*, also the *Journals* of the Chemical Society and Society of Chemical Industry, and *British Journal of Photography* (development of bacteria in silver gelatine films).

The best way to sterilise ancient implements is to suspend them in an oven at a temperature of 150° C.-180° C. for two hours, and let them cool in a free current of air in order to prevent deposit of moisture. This method is quite harmless to the metal, and will sterilise the most resisting spores. It presents obvious advantages over the use of antiseptic fluids.

36 Finsbury Pavement, E.C. G. LINDSAY JOHNSON.

Ebbing and Flowing Wells.

I HAVE had occasion to live for many months of several years close to a well that was sometimes affected by the tide like that at Newton Nottage (*NATURE*, May 12, p. 45). This was at Alibag, a few miles south of Bombay. The bed rock is a sheet of basalt of rather uneven surface, sloping westwards at the general rate of about six feet to the nautical mile. Over this, at the spot in question, were low sand-dunes, covered with palm orchards, and full of brick wells. One of my wells was twenty or twenty-five yards from true high-water mark of spring tides, though the surf washed light objects much nearer.

In the dry weather the ebb and flow did not perceptibly affect the well; but during the monsoon the sand-dunes were saturated by the heavy rainfall, and all along their seaward foot, where the sand lay on the sheet-rock, well below high-water mark, the fresh water poured out at ebb tide. When high spring tides were coincident with heavy rain the water in this well rose a little later than the tide, and several feet higher, almost to the level of the ground around the well. Its taste was not affected. At such times the surface in the well was two feet higher than the floor of my house, which stood in a hollow of the dune, a few yards to the eastward. The house was a notorious death-trap (as might be expected); and it was in the course of endeavours to get it condemned and pulled down, that I made the observations related. As it was a Government building, the records are official; and I write from memory. But the well is probably still there; and the observations, in that case, could be verified during any monsoon.

May 13.

W. F. SINCLAIR.

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TECHNICAL HIGH SCHOOLS—A COMPARISON.

AT different times attempts have been made to convey to English readers interested in scientific education some idea of the facilities provided abroad, particularly in Germany and Switzerland, for the higher technical instruction. The reports of the Technical Instruction Commissioners, and of other persons who have inspected the principal foreign schools, give full particulars of the courses of study pursued in those schools, of the rapidly increasing number of students in attendance, and of the large professorial staff attached to each institution. Exact details, however, as to the magnitude of the technical high schools of Germany have not been hitherto presented in such a form, as might readily show the full importance which our German neighbours attach to the higher scientific training, as a means of advancing their commercial interests. On my return, in the autumn of 1896, from a short visit to Bavaria and Würtemberg, in company with some of my colleagues of the Technical Instruction Commission, I gave some account, in the pages of this journal, of the new electro-technical and electro-chemical institutions, recently erected in Darmstadt in connection with the polytechnic of that town. A few weeks since, I had occasion to pay a flying visit to Aachen, and there I found close to the old polytechnic, erected in 1870, an entirely new building, opened only in 1897, and devoted almost exclusively to electrical work. This school, although not so large, nor so well equipped, as the schools in Stuttgart and Darmstadt, forms a very important addition to the facilities for the higher technical instruction which previously existed in the Rhenish city. It will be seen from the accompanying illustration (Fig. 1) that this new building is a plain structure of four stories, with no pretensions to architectural effect. It is about 140 feet long, and is of a mean depth of about 90 feet, the total area covered by the building being little less than that of the science schools of South Kensington, and about half of that of the Technical Institute of the City Guilds. Yet this building is devoted almost exclusively to the teaching of one branch of applied physics.

Dr. Bosse, the well-known energetic Minister of Education for Prussia, in his dedicatory address at the opening of this school in May last, correctly expressed German opinion when he said: "Neither the technical sciences nor the technical high schools can be said to have yet reached their goal. Both stand in the midst of a restless and irresistible movement and development pressing ever forwards." This recognition on the part of the Prussian Minister of the necessity of constantly improving educational facilities so that they may keep pace with the advance of science, is characteristic of the progressive policy of Germany.

The progress I found this year in Aachen, and eighteen months ago in Stuttgart and Darmstadt, might be observed equally in other parts of Germany, showing that our German neighbours are fully as determined, that their high schools of science shall be ahead of those of other countries, as we may be resolved, that our fleet shall be equal to that of any two other nations.

It is well known to most of the readers of this journal, but must be emphasised with a view to a comparison between the provision for scientific education in Great Britain and Germany, that the polytechnics or technical high schools are institutions exclusively devoted to the teaching of science in its practical application to engineering, manufacturing and professional pursuits. They are quite distinct from the universities, which, situated in the same town or in an adjoining city, as the case may be, comprise other faculties besides science, and, although far larger and more important, belong rather to the class of institutions known in this country